## CLAIMS

1. In a data transmission system including a station which transmits M encoded data streams using M antennas to a terminal and a station controller which controls the station, wherein M is an integer at least equal to 2, the terminal comprising:

at least one radio transceiver including P radio receivers and at least one transmitter with P being an integer at least equal to 2, each radio receiver including an antenna which receives the M encoded data streams and a detecting function which decodes the M encoded data streams into decoded data; and

a terminal controller which controls the at least one radio transceiver; and wherein

in response to a transmission from the station that the terminal is to operate at least one of the radio receivers in at least one frequency band not used to receive the M encoded data streams during at least one identified data frame therein to measure a radio indicator of the at least one frequency band not used to receive the M encoded data streams, the terminal controller causes at least one of the radio receivers to be turned to the at least one frequency band during the at least one identified data frame and to make measurements therein and to transmit the measurements with the at least one transmitter of the at least one radio transceiver to the station.

2. A terminal in accordance with claim 1 wherein:

the at least one frequency band is an inter-frequency band in the data transmission system.

3. A terminal in accordance with claim 1 wherein:

the at least one frequency band is in another system than the data transmission system.

4. A terminal in accordance with claim 1 wherein:

the station comprises a demultiplexer which demultiplexes an input data stream into M substreams, each substream is spread with one of N spreading codes where N is an integer at least equal to 2 with a mutually orthogonal pilot symbol being added to a common pilot channel transmitted by each antenna; and wherein

the at least one transceiver comprises in each radio receiver a despreader coupled to the antenna, a space-time rake combiner which receives outputs from the despreaders, a channel estimation function coupled to each of the antennas of the radio receivers which provides a channel estimation to the space-time rake combiner, a detector is coupled to outputs of the space-time rake combiner which provides outputs of the M data streams, and a multiplexer, coupled to the outputs of the detector which outputs a multiplexed data stream corresponding to the input data stream.

5. A terminal in accordance with claim 2 wherein:

the station comprises a demultiplexer which demultiplexes an input data stream into M substreams, each substream is spread with one of N spreading codes where N is an integer at least equal to 2 with a mutually orthogonal pilot symbol being added to a common pilot channel transmitted by each antenna; and wherein

the at least one transceiver comprises in each radio receiver a despreader coupled to the antenna, a space-time rake combiner which receives outputs from the despreaders, a channel estimation function coupled to each of the antennas of the radio receivers which provides a channel estimation to the space-time rake combiner, a detector is coupled to outputs of the space-time rake combiner which provides outputs of the M data streams, and a multiplexer, coupled to the outputs of the detector which outputs a multiplexed data stream corresponding to the input data stream.

6. A terminal in accordance with claim 3 wherein:

the station comprises a demultiplexer which demultiplexes an input data stream into M substreams, each substream is spread with one of N spreading codes where N is an integer at least equal to 2 with a mutually orthogonal pilot symbol being added to a common pilot channel transmitted by each antenna; and wherein

the at least one transceiver comprises in each radio receiver a despreader coupled to the antenna, a space-time rake combiner which receives outputs from the despreaders, a channel estimation function coupled to each of the antennas of the

radio receivers which provides a channel estimation to the space-time rake combiner, a detector is coupled to outputs of the space-time rake combiner which provides outputs of the M data streams, and a multiplexer, coupled to the outputs of the detector which outputs a multiplexed data stream corresponding to the input data stream.

7. A terminal in accordance with claim 2 wherein:

the terminal uses wide band code division multiple access (WCDMA) for receiving the M encoded streams.

8. A terminal in accordance with claim 2 wherein:

the terminal uses global system for mobile communications (GSM) for receiving the M encoded data streams.

9. A terminal in accordance with claim 3 wherein:

the terminal uses wide band code division multiple access (WCDMA) for receiving the M encoded data streams and the another system uses global system for mobile communications (GSM).

10. A terminal in accordance with claim 3 wherein:

the terminal uses global system for mobile communications (GSM) for for receiving the M encoded data streams and the another system uses wide band code division multiple access (WCDMA).

11. A terminal in accordance with claim 1 wherein the radio indicator comprises:

pilot signal power.

12. A terminal in accordance with claim 1 wherein the radio indicator comprises:

total received signal power.

13. A terminal in accordance with claim 1 wherein the radio indicator comprises:

Ec/10.

14. A terminal in accordance with claim 1 wherein the radio indicator comprises:

cell identification.

15. A data transmission system comprising:

a terminal;

a station which transmits M encoded data streams using M antennas to the terminal wherein M is an integer at least equal to 2;

a station controller which controls the station;

the terminal including at least one radio transceiver including P receivers and at least one transmitter, with P being an integer at least equal to 2, each radio receiver including an antenna which receives the M encoded data

streams and a detecting function which decodes the M encoded data streams into decoded data; and

a terminal controller which controls the at least one radio transceiver; and wherein

in response to a transmission from the station that the terminal is to operate at least one of the radio receivers in at least one frequency band not used to receive the M data streams during at least one identified data frame therein to measure a radio indicator of the at least one frequency band not used to receive the M encoded data streams, the terminal controller causes at least one of the radio receivers to be tuned to the at least one frequency band during the at least one identified data frame and to make measurements of the radio energy therein and to transmit the measurements with the at least one transmitter of the at least one radio transceiver to the station.

16. A system in accordance with claim 15 wherein:

the at least one frequency band is an inter-frequency band in the data transmission system.

17. A system in accordance with claim 15 wherein:

the at least one frequency band is in another system than the data transmission system.

18. A system in accordance with claim 15 wherein:

the station comprises a demultiplexer which demultiplexes an input data stream into M substreams, each substream is spread with one of N spreading codes where N is an integer at least equal to 2 with a mutually orthogonal pilot symbol being added to a common pilot channel transmitted by each antenna; and wherein

the at least one transceiver comprises in each radio receiver a despreader coupled to the antenna, a space-time rake combiner which receives outputs from the despreaders, a channel estimation function coupled to each of the antennas of the radio receivers which provides a channel estimation to the space-time rake combiner, a detector is coupled to outputs of the space-time rake combiner which provides outputs of the M data streams, and a multiplexer, coupled to the outputs of the detector which outputs a multiplexed data stream corresponding to the input data stream.

19. A system in accordance with claim 16 wherein:

the station comprises a demultiplexer which demultiplexes an input data stream into M substreams, each substream is spread with one of N spreading codes where N is an integer at least equal to 2 with a mutually orthogonal pilot symbol being added to a common pilot channel transmitted by each antenna; and wherein

the at least one transceiver comprises in each radio receiver a despreader coupled to the antenna, a space-time rake combiner which receives outputs from the

despreaders, a channel estimation function coupled to each of the antennas of the radio receivers which provides a channel estimation to the space-time rake combiner, a detector is coupled to outputs of the space-time rake combiner which provides outputs of the M data streams, and a multiplexer, coupled to the outputs of the detector which outputs a multiplexed data stream corresponding to the input data stream.

20. A system in accordance with claim 17 wherein:

the station comprises a demultiplexer which demultiplexes an input data stream into M substreams, each substream is spread with one of the N spreading codes where N is an integer at least equal to 2 with a mutually orthogonal pilot symbol being added to a common pilot channel transmitted by each antenna; and wherein

the at least one transceiver comprises in each radio receiver chain a despreader coupled to the antenna, a space-time rake combiner which receives outputs from the despreaders, a channel estimation function coupled to each of the antennas of the radio receiver chains which provides a channel estimation to the space-time rake combiner, the detector of each chain is coupled to outputs of the space-time rake combiner and provides outputs of the M data streams, and a multiplexer, coupled to the outputs of the detector which outputs a multiplexed data stream corresponding to the input data stream.

21. A system in accordance with claim 16 wherein:

the terminal uses wide band code division multiple access (WCDMA) for receiving the M encoded data streams.

22. A system in accordance with claim 16 wherein:

the terminal uses global system for mobile communications (GSM) for receiving the M encoded data streams.

23. A system in accordance with claim 17 wherein:

the terminal uses wide band code division multiple access (WCDMA) for receiving the M encoded data streams and the another system uses global system for mobile communications (GSM).

24. A system in accordance with claim 17 wherein:

the terminal uses global system for mobile communications (GSM) for receiving the M encoded data streams and the another system uses wide band code division multiple access (WCDMA).

25. A system in accordance with claim 17 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

26. A system in accordance with claim 18 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

27. A system in accordance with claim 19 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

28. A system in accordance with claim 20 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

29. A system in accordance with claim 21 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

30. A system in accordance with claim 22 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

31. A system in accordance with claim 23 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

32. A system in accordance with claim 24 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

33. A system in accordance with claim 25 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

34. A system in accordance with claim 15 wherein the radio indicator comprises:

pilot signal power.

35. A system in accordance with claim 15 wherein the radio indicator comprises:

total received signal power.

36. A system in accordance with claim 15 wherein the radio indicator comprises:

Ec/10.

37. A system in accordance with claim 15 wherein the radio indicator comprises:

cell identification.

38. In a data transmission system including a station which transmits M encoded data streams using M antennas to a terminal comprising at least one radio transceiver including P radio receivers and at least one transmitter with P being an integer at least equal to 2, each radio receiver including an antenna which receives the M encoded data streams and a detecting function which decodes the M encoded data streams into decoded data, a station controller which controls the station, wherein M is an integer at least equal to 2, and a terminal controller which controls the that at least one radio transceiver, a method comprising:

in response to a transmission from the station that the terminal is to operate at least one of the radio receivers in at least one frequency band not used to receive the M encoded data streams during at least one identified data frame therein to measure a radio indicator of the at least one frequency band not used to receive the M encoded data streams, the terminal controller causes at least one of the radio receivers to be turned to the at least one frequency band during the at least one identified data frame and to make measurements therein and to transmit the

measurements with the at least one transmitter of the at least one radio transceiver to the station.

39. A method in accordance with claim 38 wherein:

the at least one frequency band is an inter-frequency band in the data transmission system.

40. A method in accordance with claim 38 wherein:

the at least one frequency band is in another system than the data transmission system.

41. A method in accordance with claim 38 wherein:

the station comprises a demultiplexer which demultiplexes an input data stream into M substreams, each substream is spread with one of N spreading codes where N is an integer at least equal to 2 with a mutually orthogonal pilot symbol being added to a common pilot channel transmitted by each antenna; and wherein

the at least one transceiver comprises in each radio receiver a despreader coupled to the antenna, a space-time rake combiner which receives outputs from the despreaders, a channel estimation function coupled to each of the antennas of the radio receivers which provides a channel estimation to the space-time rake combiner, a detector is coupled to outputs of the space-time rake combiner which provides outputs of the M data streams, and a multiplexer, coupled to the outputs of

the detector which outputs a multiplexed data stream corresponding to the input data stream.

42. A method in accordance with claim 38 wherein:

the station comprises a demultiplexer which demultiplexes an input data stream into M substreams, each substream is spread with one of N spreading codes where N is an integer at least equal to 2 with a mutually orthogonal pilot symbol being added to a common pilot channel transmitted by each antenna; and wherein

the at least one transceiver comprises in each radio receiver a despreader coupled to the antenna, a space-time rake combiner which receives outputs from the despreaders, a channel estimation function coupled to each of the antennas of the radio receivers which provides a channel estimation to the space-time rake combiner, a detector is coupled to outputs of the space-time rake combiner which provides outputs of the M data streams, and a multiplexer, coupled to the outputs of the detector which outputs a multiplexed data stream corresponding to the input data stream.

43. A method in accordance with claim 38 wherein:

the station comprises a demultiplexer which demultiplexes an input data stream into M substreams, each substream is spread with one of N spreading codes where N is an integer at least equal to 2 with a mutually orthogonal pilot symbol being added to a common pilot channel transmitted by each antenna; and wherein

the at least one transceiver comprises in each radio receiver a despreader coupled to the antenna, a space-time rake combiner which receives outputs from the despreaders, a channel estimation function coupled to each of the antennas of the radio receivers which provides a channel estimation to the space-time rake combiner, a detector is coupled to outputs of the space-time rake combiner which provides outputs of the M data streams, and a multiplexer, coupled to the outputs of the detector which outputs a multiplexed data stream corresponding to the input data stream.

44. A method in accordance with claim 39 wherein:

the terminal uses wide band code division multiple access (WCDMA) for receiving the M encoded streams.

45. A method in accordance with claim 39 wherein:

the terminal uses global system for mobile communications (GSM) for receiving the M encoded data streams.

46. A method in accordance with claim 40 wherein:

the terminal uses wide band code division multiple access (WCDMA) for receiving the M encoded data streams and the another system uses global system for mobile communications (GSM).

47. A method in accordance with claim 40 wherein:

the terminal uses global system for mobile communications (GSM) for

for receiving the M encoded data streams and the another system uses wide band code division multiple access (WCDMA).

48. A method in accordance with claim 38 wherein the radio indicator comprises:

pilot signal power.

49. A method in accordance with claim 38 wherein the radio indicator comprises:

total received signal power.

50. A method in accordance with claim 38 wherein the radio indicator comprises:

Ec/10.

51. A method in accordance with claim 38 wherein the radio indicator comprises:

cell identification.

52. A method in accordance with claim 39 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

53. A method in accordance with claim 40 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

54. A method in accordance with claim 41 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

55. A method in accordance with claim 42 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

56. A method in accordance with claim 43 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

57. A method in accordance with claim 44 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

58. A method in accordance with claim 45 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

59. A system in accordance with claim 46 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.

60. A system in accordance with claim 47 wherein:

the M encoded data streams are transmitted with a higher power level during the at least one identified frame than a power level used to transmit other frames of the encoded data streams.